

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY

2102-F-21-R-42

Name: Ravine Lake **County:** Beadle
Legal Description: T111N-R61W-Sec 6, 30, 31
Location from nearest town: Highway 14, east edge of Huron, SD

Dates of present survey: August 5-6, 2009
Dates of last survey: July 31, - August 1, 2007

Primary Game Species	Other Species
White Crappie	Black Bullhead
Channel Catfish	Common Carp
Walleye	Green Sunfish
Northern Pike	Orange-spotted Sunfish

PHYSICAL DATA

Surface Area: 72 acres **Watershed area:** 77,178 acres
Maximum depth: 14 feet **Mean depth:** 6.4 feet
Volume: 459.5 acre feet **Shoreline length:** 3.5 miles
Contour map available: Yes **Date mapped:** 1988
Lake elevation observed during the survey: 1 ft. low
Beneficial use classifications: (5) warmwater semipermanent fish life propagation, (7) immersion recreation, (8) limited contact recreation and (9) wildlife propagation and stock watering.

Introduction

Ravine Lake is an artificial impoundment formed by the construction of a dam across Broadland Creek. Located on the north edge of Huron, the lake is an important recreational asset for the City of Huron. The lake has a long history of poor water quality, algae blooms, overabundant rough fish populations and frequent fish kills. In 1998, 95,812 cubic yards of silt were removed from the lake by dredging at a cost of nearly \$200,000. While the dredging made the lake deeper, it did little for water quality and fish kills still occur regularly.

Ownership of Lake and Adjacent Lakeshore Properties

Ravine Lake is owned by the City of Huron and the fishery is managed by the South Dakota Department of Game, Fish and Parks (GFP). Any property not owned by the City of Huron is privately owned.

Fishing Access

There is a boat ramp located on the east side of the lake and shore fishing is available at several locations on city property.

Field Observations of Water Quality and Aquatic Vegetation

The water in Ravine Lake was stained brown and had a Secchi depth measurement of 0.9 m (3 ft). No submerged vegetation was observed anywhere in the lake. Some cattail (*Typha spp.*) was present in the north end.

BIOLOGICAL DATA

Methods:

Ravine Lake was sampled on August 5-6, 2009 with five overnight trap net sets. The trap nets are constructed with 19-mm-bar-mesh ($\frac{3}{4}$ in) netting, 0.9 m high x 1.5 m wide (3 ft high x 5 ft wide) frames and 18.3 m (60 ft) long leads.

Results and Discussion:

Trap Net Catch

Black bullheads (75.4%) were the most abundant species in the trap net sample (Table 1). Black crappie, white crappie, green sunfish, channel catfish, common carp, hybrid sunfish, walleye, and yellow perch were also sampled.

Table 1. Total catch from five overnight trap net sets at Ravine Lake, Beadle County, August 5-6, 2009.

Species	Number	Percent	CPUE	80% C.I.	Mean CPUE*	PSD	RSD-P	Mean Wr
Black Bullhead	205	75.4	41.0	+22.0	345.2	0	0	78
Black Crappie	22	8.1	4.4	+1.7	0.5	55	0	104
White Crappie	22	8.1	4.4	+1.7	2.6	55	0	93
Green Sunfish	8	2.9	1.6	+1.5	1.4	--	--	--
Channel Catfish	5	1.8	1.0	+0.7	1.4	--	--	--
Common Carp	4	1.5	0.8	+0.7	5.6	--	--	--
Hybrid Sunfish	3	1.1	0.6	+0.5	0.0	--	--	--
Walleye	2	0.7	0.4	+0.5	0.2	--	--	--
Yellow Perch	1	0.4	0.2	+0.3	2.5	--	--	--

* 5 years (1999, 2001, 2003, 2005, 2007)

Table 2. Catch per unit effort by length category for various fish species captured with trap nets in Ravine Lake August 5-6, 2009.

Species	Substock	Stock	S-Q	Q-P	P+	All sizes	80% C.I.
Black Bullhead	--	41.0	41.0	--	--	41.0	+22.0
Black Crappie	--	4.4	2.0	2.4	--	4.4	+1.7
White Crappie	--	4.4	2.0	2.4	--	4.4	+1.7
Green Sunfish	--	1.6	1.4	0.2	--	1.6	+1.5
Channel Catfish	--	1.0	0.6	0.4	--	1.0	+0.7
Common Carp	--	0.8	0.2	0.6	--	0.8	+0.7
Hybrid Sunfish*	--	--	--	--	--	0.6	+0.5
Walleye	--	0.4	--	0.4	--	0.4	+0.5
Yellow Perch	--	0.2	0.2	--	--	0.2	+0.3

*No length categories established. Length categories can be found in Appendix A.

Game Fish and Panfish

The same number and sizes of both black and white crappies were sampled this year (Table 2). Some channel catfish have been sampled since the 2003 stocking (Table 4); however, unbaited trap nets are not the most effective tool for catfish sampling and we may be underestimating their abundance. Largemouth bass were last stocked in 2002 and angler catches have been reported. Northern pike, walleye and yellow perch are also present in low abundance.

Black Bullhead

Management objective: Maintain a black bullhead population with a trap net CPUE of less than 100.

Black bullhead CPUE fell to 41.0, the lowest CPUE ever recorded and well within the management objective. However, the population is still dominated by small, slow growing fish since mean length increased only 1 cm per year since 2003 (Table 3). The presence of walleye, northern pike, channel catfish and largemouth bass appear to be having an effect on bullhead abundance.

Table 3. Black bullhead trap-net CPUE, PSD, RSD-P, and mean Wr for Ravine Lake, Beadle County, 2001-2009.

	2001	2002	2003	2004	2005	2006	2007	2008	2009	Mean*
CPUE	819.3		222.2		82.1		104.4		41.0	345.2
PSD	0		0		0		8		0	2
RSD-P	0		0		0		0		0	0
Mean Wr	--		68		94		94		78	85
Mean Length			144		166		181		199	164

*5 years (1999, 2001, 2003, 2005, 2007)

All Species

Table 4. Trap-net CPUE for all fish species sampled in Ravine Lake, Beadle County, 2001-2009.

Species	2001	2002	2003	2004	2005	2006	2007	2008	2009
COC	12.3		2.0		8.6		1.2		0.8
BLB	819.3		222.2		82.1		104.4		41.0
CCF	--		2.0		2.0		3.0		1.0
NOP	--		--		1.3		--		--
GSF	4.0		1.4		0.1		--		1.6
OSF	--		23.6		0.1		2.0		--
HYB	--		--		--		--		0.6
WHC	--		3.0		0.4		8.6		4.4
BLC	--		--		2.1		0.4		4.4
YEP	0.5		--		0.1		10.8		0.2
WAE	--		0.6		--		--		0.4

COC (Common Carp), BLB (Black Bullhead), CCF (Channel Catfish), NOP (Northern Pike), GSF (Green Sunfish), OSF (Orange-spotted Sunfish), HYB (Hybrid Sunfish), WHC (White Crappie), BLC (Black Crappie), YEP (Yellow Perch), WAE (Walleye)

MANAGEMENT RECOMMENDATIONS

1. Manage Ravine Lake with overall goal of providing quality fishing opportunity for residents of the City of Huron and surrounding area.
2. Stock adult channel catfish, northern pike and walleye, when available, to provide diverse fishing opportunity, high catch rates and nuisance fish control.
3. Work with the City of Huron and DENR to improve the water quality when opportunities arise.
4. Consider research to determine possible causes for poor fish production. Possibilities include poor productivity, water quality, invertebrate populations, stratification, and lack of submerged vegetation.

Table 5. Stocking record for Ravine Lake, Beadle County, 1991-2009.

Year	Number	Species	Size
1991	8,300	Largemouth Bass	Fingerling
	500	Northern Pike	Adult
1999	14,400	Walleye	Fingerling
	764	White Crappie	Adult
2000	14	Bluegill	Fingerling
	834	White Crappie	Adult
2001	850	Walleye	Lrg. Fingerling
2002	8,635	Largemouth Bass	Fingerling
	8,478	Yellow Perch	Juvenile
2003	233	Channel Catfish	Adult
2004	225	Channel Catfish	Adult
	600	Northern Pike	Adult
2005	250	Channel Catfish	Adult
	270	Northern Pike	Adult
2006	166	Channel Catfish	Adult
2007	519	Walleye	Adult

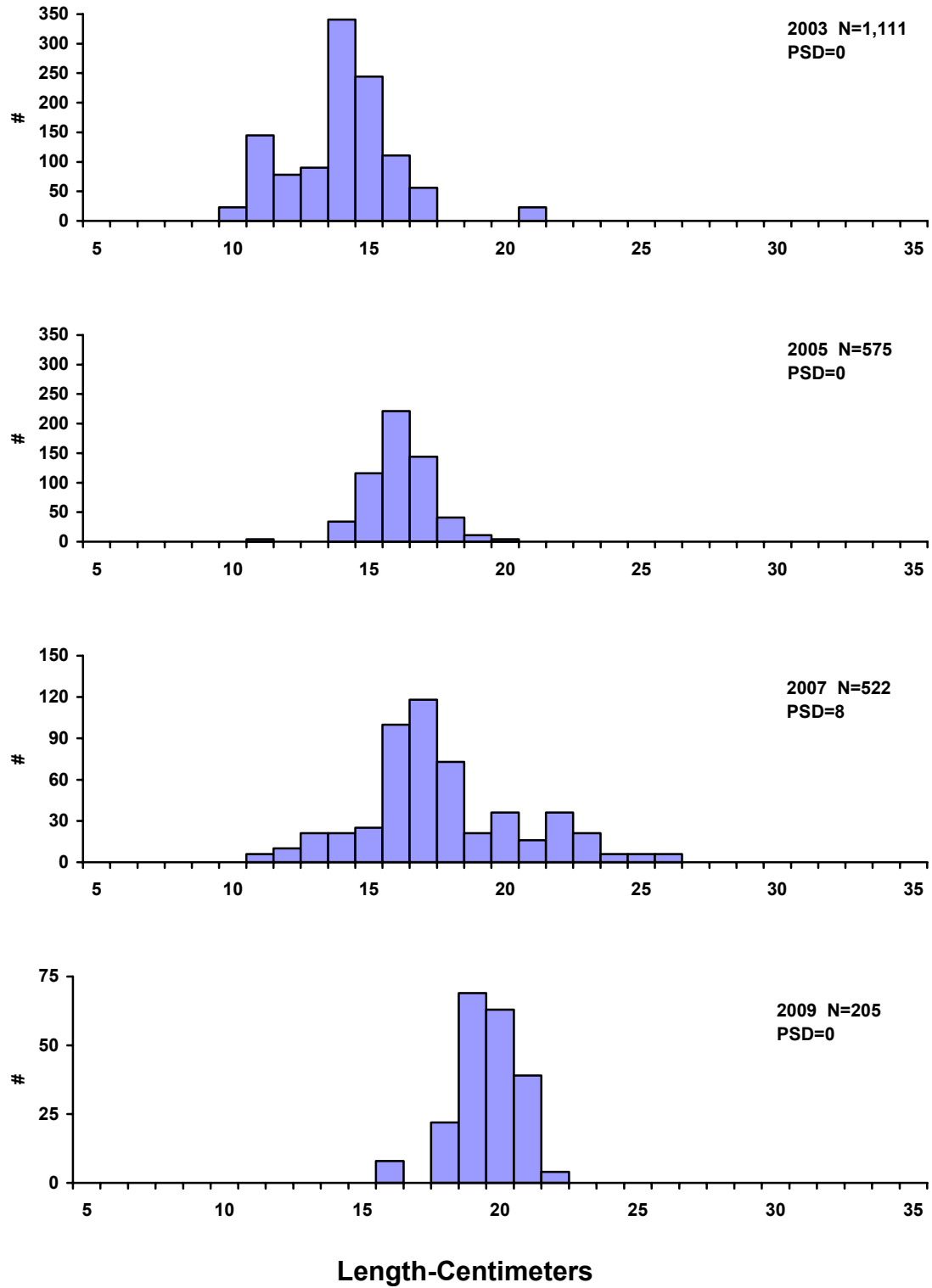


Figure 1. Length frequency histograms for black bullheads sampled with trap nets in Ravine Lake, Beadle County, 2003, 2005, 2007, and 2009.

Appendix A. A brief explanation of catch per unit effort (CPUE), proportional stock density (PSD), relative stock density (RSD) and relative weight (Wr).

Catch Per Unit Effort (CPUE) is the catch of animals in numbers or in weight taken by a defined period of effort. Can refer to trap-net nights of effort, gill-net nights of effort, catch per hour of electrofishing, etc.

Proportional Stock Density (PSD) is calculated by the following formula:

$$\text{PSD} = \frac{\text{Number of fish} > \text{quality length}}{\text{Number of fish} \geq \text{stock length}} \times 100$$

Relative Stock Density (RSD-P) is calculated by the fo

$$\text{RSD-P} = \frac{\text{Number of fish} > \text{preferred length}}{\text{Number of fish} \geq \text{stock length}} \times 100$$

PSD and RSD-P are unitless and usually calculated to the nearest whole digit.

Size categories for selected species found in Region 3 lake surveys, in centimeters.

Species	Stock	Quality	Preferred	Memorable	Trophy
Walleye	25	38	51	63	76
Sauger	20	30	38	51	63
Yellow perch	13	20	25	30	38
Black crappie	13	20	25	30	38
White crappie	13	20	25	30	38
Bluegill	8	15	20	25	30
Largemouth bass	20	30	38	51	63
Smallmouth bass	18	28	35	43	51
Northern pike	35	53	71	86	112
Channel catfish	28	41	61	71	91
Black bullhead	15	23	30	38	46
Common carp	28	41	53	66	84
Bigmouth buffalo	28	41	53	66	84
Smallmouth buffalo	28	41	53	66	84

For most fish, 30-60 or 40-70 are typical objective ranges for “balanced” populations. Values less than the objective range indicate a population dominated by small fish while values greater than the objective range indicate a population comprised mainly of large fish.

Relative weight (Wr) is a condition index that quantifies fish condition (i.e., how much does a fish weigh for its length). A Wr range of 90-100 is a typical objective for most fish species. When mean Wr values are well below 100 for a size group, problems may exist in food and feeding relationships. When mean Wr values are well above 100 for a size group, fish may not be making the best use of available prey.